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It turns out vodka and icy roads can be a good mix



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By [Matt Rocheleau](#)

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*Editor's note: This is part of a series exploring initiatives around Boston, the country, and the world that have succeeded or hold great promise, from government to business to culture. For more stories, [click here](#).*

Vodka and icy roads sound like a horrible concoction.

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But it turns out the liquor — or at least by-products of the distilling process — can be used to help keep roads clean and safe during winter weather.

It's one of a handful of ingredients, some of which you've probably consumed, that are improving how public works crews around the country fight snow and ice buildup on pavement.

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The products add up to a veritable roadway pantry: beet, pickle, and tomato juices, cheese-based brines, molasses, corn, apple, cherry, and grape pomaces, Alaska peony leaves, dandelions, and Kentucky blue grass.

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So how does it all work?

Researchers say each of those unconventional items can be combined with road salt to create a liquid solution that's less corrosive for vehicles and pavement and more effective at preventing snow and ice from accumulation than using just salt alone or salt mixed with water.

The agricultural materials all contain [carbohydrates](#), which work with the salt to further lower the freezing point of water, helping prevent ice from forming and bonding to the street.

And, because they are applied as a liquid mixture, they help the salt stick, too, limiting how much bounces off the road, so the salt has more time to work its magic, experts say.

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“It does help enhance performance, and in the last decade, this concept has really picked up,” said Laura Fay, scientist and program manager for the Winter Maintenance & Effects research group at the Western Transportation Institute at Montana State University.

The various additive ingredients have been experimented with in laboratories, and used in some local communities.

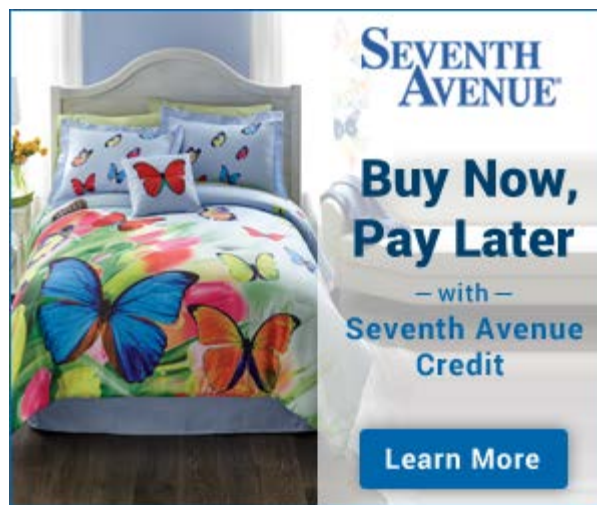
Wellesley Highway Division general foreman Kevin Collins said he and his team are fans of the molasses-based product the town started using last winter.

“We’ve had great success using this,” said Collins. “Last year, it was really in its infancy stage and this year we’re using it more and trying to get ahead of storms.”

The product, called [Magic-0](#) (and pronounced “Magic Minus Zero”) is sold by a company based near Albany, N.Y., and is essentially a blend of molasses and magnesium chloride.

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Collins said Wellesley officials began researching carbohydrate-based additives in recent years after attending a national public works conference, where they heard rave reviews from officials using them in other parts of the country.

The City of Boston uses salt primarily and sometimes will use a mixture of salt and water, said deputy public works commissioner Michael Brohel. But he said carbohydrate-based additives could be in the city's future.

"We're always open to testing out new methods," Brohel said.

Interest in, and experimentation with, carbohydrate-based substances has risen in recent years due to positive results from use of one of the older and more well-know additives, beet juice, long popular in the Midwest.

"With the success of the beet products, people are looking at what else they can use," said Fay.

Of course, cost is a major factor driving what public works agencies use to treat roads, so they're generally on the hunt for substances that are cheap and also local, because transporting the materials over long distances can quickly become too expensive to be worthwhile.

And that's why officials said beet products have been popular with public works agencies located around factories in the Midwest that process the plant.

For much the same reason, cheese brines have been popular in parts of [Wisconsin](#).

In some cases, the additives are actually substances factories would normally toss out as waste, which allows public works agencies to buy them at low prices.

Leftover [by-products of distilling](#) and brewing processes have also been used as additives in places known for beer and alcohol production, including in [Massachusetts](#).

Xianming Shi, a civil and environmental engineering professor at Washington State University and a [leading expert on the topic](#), several years ago developed an effective additive from leftover, non-drinkable liquids produced by a vodka distillery in Alaska. He's also found that other substances, such as apple pomace, work as effective additives to salt.

Shi said a key benefit of the additives is this: They improve effectiveness of preventing ice buildup on pavement, thus allowing public works crews to buy and use less environmentally-harmful salt.

There's no known, cost-effective way to eliminate the need for salt entirely. But, for now, "our goal is to reduce the need for chlorides as much as possible," said Shi. "Even reducing salt use by 20 percent would do a lot."

Road salt eventually gets washed into the surrounding environment and waterways, building up over time. It not only corrodes vehicles, bridges, and other infrastructure, but it also destroys plants, harms animals, and contaminates drinking water.

But some believe that carbohydrate-based additives come with their own environmental concerns, at least temporary ones, particularly when they seep into waterways. There, they can promote bacteria growth and can also temporarily lower oxygen levels, potentially putting stress on plants and aquatic animals.

There have been other complaints about some of the additives. They aren't cost-effective to use in every situation. Some smell funky and feel sticky when stepped on. There have even been reports of additives clogging the equipment that sprays them on roads.

But experts said refinements have been made over the years to try to reduce, if not eliminate, those negative side effects.

Collins in Wellesley said he hasn't had any of those issues with the molasses-based product they began using last winter. He said the town is open to trying other additives.

Public works agencies "are just starting to get their feet wet with this," said Collins. "I think you're going to see more of a spike in people trying these products."

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